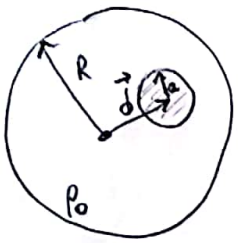
E2|



Ley de Gauss

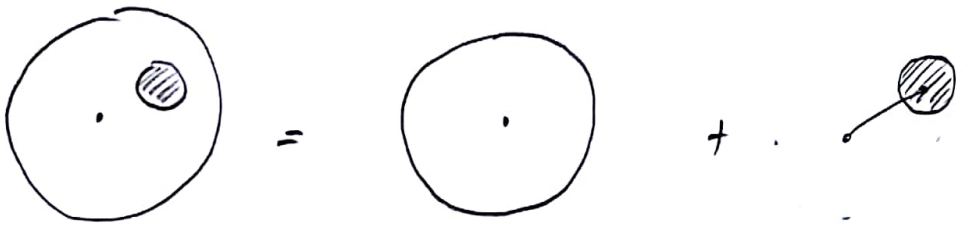
$$\int_S \vec{E}\,d\vec{s} = \frac{1}{\varepsilon_0}\int_V \rho_0\,dv$$

$$\rightarrow \int_S \vec{E}\,ds = \int_0^{\pi}\int_0^{2\pi} E(r)\,r^2 \sin\phi\,d\phi\,d\theta = \underline{4\pi r^2 E(r)}$$

Solo calculamos la carga encerrada dentro de la esfera

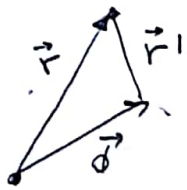
$$\Rightarrow \frac{1}{\varepsilon_0}\int_V \rho_0\,dv = \frac{1}{\varepsilon_0}\rho_0\,\frac{4}{3}\pi r^3 \rightarrow 4\pi r^2 E(r) = \frac{1}{\varepsilon_0}\rho_0\,\frac{4}{3}\pi r^3$$

$$\rightarrow E(r) = \frac{1}{\varepsilon_0}\frac{\rho_0 r}{3}\hat{r}$$

$\Rightarrow$ 

esfera + cavidad = esfera maciza $(+\rho_0)$ + esfera maciza $(-\rho_0)$

Principio de superposición



$\rightarrow \vec{r} = \vec{r}' + \vec{d}$

$$\rightarrow E_T = E_1 + E_2$$

$$= \frac{\rho_0 r}{3\varepsilon_0} + \frac{-\rho_0 r'}{3\varepsilon_0}$$

$$= \frac{\rho_0}{3\varepsilon_0}(\vec{r} - \vec{r}') = \boxed{\frac{\rho_0}{3\varepsilon_0}\vec{d} = E_T}$$

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